CLAIMS

I CLAIM:

1. In the context of a material system investigating system sequentially comprising:

source of electromagnetic radiation;

polarizer;

stage for supporting a sample system

analyzer; and

detector;

at least one odd bounce optical image rotating system being present between said polarizer and analyzer, said at least one odd bounce optical image rotating system comprising an odd number of at least three reflective elements oriented such that a beam of electromagnetic radiation provided by said source of electromagnetic radiation, after passing through said polarizer, interacts with each of said at least three reflective elements of said at least one odd bounce optical image rotating system and exits therefrom along a non-deviated non-displaced trajectory, said beam of electromagnetic radiation also interacting with a sample system placed on said stage for supporting a sample system, and said analyzer before entering said detector.

2. A material system investigating system as in Claim 1, in which the at least one odd bounce optical image rotating system consists of a selection from the group consisting of three and five reflective elements.

3. A material system investigating system as in Claim 2, in which the at least two of the reflective elements are adjustable such that the angle of incidence of a beam of electromagnetic radiation interacting therewith can be controlled.

4. A material system investigating system as in Claim 1, which further comprises a compensator system present between said polarizer and analyzer.

5. A material system investigating system as in Claim 4, in the compensator system comprises, as viewed in upright side elevation, first and second orientation adjustable mirrored elements which each have reflective surfaces; said compensator system further comprising a third element which, as viewed in upright side elevation presents with first and second sides which project to the left and right and downward from an upper point, said third element being made of material which provides reflective interfaces on first and second sides inside thereof; said third element being oriented with respect to the first and second orientation adjustable elements such that in use an input electromagnetic beam of radiation caused to approach one of said first and second orientation adjustable mirrored elements along an essentially horizontally oriented locus, is caused to externally reflect therefrom upwardly vertically oriented, then enter said third element and essentially totally internally reflect from one of said first and second sides thereof, then proceed along an essentially horizontal locus and essentially totally internally reflect from the other of said first and second sides and proceed along an essentially downward vertically oriented locus, then reflect from the other of said first and second adjustable mirrored elements and proceed along an essentially horizontally oriented propagation direction locus which is essentially undeviated and undisplaced from the essentially horizontally oriented locus of said input beam of

electromagnetic radiation even when said compensator is caused to rotate about the locus of the beam of electromagnetic radiation, with the result being that retardation is entered between orthogonal components of said input electromagnetic beam of radiation.

6. A method of obtaining data from a material system investigating system comprising the steps of:

a. providing a material system investigating system which sequentially comprises:

source of electromagnetic radiation;

polarizer;

stage for supporting a sample system

analyzer; and

detector;

said material system investigating system further comprising at least one odd bounce optical image rotating system being present between said polarizer and analyzer, said at least one odd bounce optical image rotating system comprising an odd number of at least three reflective elements oriented such that a beam of electromagnetic radiation provided by said source of electromagnetic radiation, after passing through said polarizer, interacts with each of said at least three reflective elements of said at least one odd bounce optical image rotating system and exits therefrom along a non-deviated non-displaced trajectory, said beam of electromagnetic radiation also interacting with a sample system placed on said stage for supporting a sample

system, and said analyzer before entering said detector;

b. placing a material system on said stage for supporting a sample system;

c. entering an electromagnetic beam to said polarizer from said source of electromagnetic radiation and causing it to impinge upon said material system;

d. detecting a beam of electromagnetic radiation exiting from said analyzer into said detector system.

7. A method of obtaining data as in Claim 6, which further comprises the step of causing the at least one odd bounce optical image rotating system to stepwise or continuously rotate around the locus of the trajectory of the electromagnetic beam while practicing step d.

8. A system for effecting a polarization state change comprising in functional combination:

a fixed position polarizer; and

an odd bounce optical image rotating system comprising a sequence of an odd number of reflective elements oriented in a manner which causes an entering beam of electromagnetic radiation to reflect from a first thereof onto the second thereof and from the second thereof onto the third thereof etc., such that said odd number of reflections cause a beam of electromagnetic radiation to emerge from the last reflective element which is not significantly deviated or displaced from the locus of the input beam, even

when the odd bounce optical image rotating system is caused to rotate about an axis coincident with the locus of the beam of electromagnetic radiation.

9. A method of effecting and changing a polarization state of a beam of electromagnetic radiation comprising the steps of:

a. providing a system for effecting a polarization state change comprising in functional combination:

a fixed position polarizer; and

an odd bounce optical image rotating system comprising a sequence of an odd number of reflective elements oriented in a manner which causes an entering beam of electromagnetic radiation to reflect from a first thereof onto the second thereof and from the second thereof onto the third thereof etc., such that said odd number of reflections cause a beam of electromagnetic radiation to emerge from the last reflective element which is not significantly deviated or displaced from the locus of the input beam, even when the odd bounce optical image rotating system is caused to rotate about an axis coincident with the locus of the beam of electromagnetic radiation;

b. entering an electromagnetic beam to said polarizer;

c. stepwise or continuously rotating said odd bounce optical image rotating system about an axis coincident with the locus of the electromagnetic beam.

10. A method of effecting and changing a polarization state of a

beam of electromagnetic radiation as in Claim 9 in which the odd bounce optical image rotating system is stepwise rotated about the axis coincident with the locus of the electromagnetic beam such that the polarization state of said beam of electromagnetic radiation is generally affected much as would be the case if the polarizer were so stepwise rotated.